

**WE CLAIM:**

1. A method for digitizing an intramedullary canal axis of a bone in computer-assisted surgery, comprising the steps of:

performing an opening in a bone to expose an intramedullary canal of the bone;

providing a tool trackable in space for position and orientation and a frame of reference on the bone, said tool having a leading end thereof being positionable in a determined way with respect to a surface of the intramedullary canal; and

obtaining the axis of the intramedullary canal with respect to the frame of reference by calculating and relating reference points in the intramedullary canal by inserting the leading end of the tool at given depths in the intramedullary canal and calculating a reference point of the intramedullary canal for each said given depths as a function of a position and orientation of said tool having the leading end positioned in said determined way.

2. The method according to claim 1, wherein the method is performed on an anatomical bone model or on a cadaver.

3. An apparatus for obtaining an axis of an intramedullary canal of an exposed bone with a position tracking system in computer-assisted surgery, comprising:

a detectable device trackable in space for position and orientation;

a stem portion secured to the detectable device so as to be tracked for position and orientation, the stem portion having a leading end insertable in an intramedullary

canal of the bone through an opening in the bone, and being adapted to be handled by a following end thereof; and

a tip portion at the leading end of the stem portion, the tip portion being positionable in a determined way with respect to a surface of the intramedullary canal, such that reference points with respect to the intramedullary canal are calculable as a function of the position and orientation of the detectable device, said reference points being related to define an axis of the intramedullary canal.

4. The apparatus according to claim 3, wherein the tip portion has two fingers actuatable from the following end of the stem portion to extend radially from the stem portion to center the leading end of the stem portion in the intramedullary canal.

5. The apparatus according to claim 4, wherein the fingers are pivotally mounted to one another.

6. The apparatus according to claim 4, wherein the fingers are biased to be retracted radially, so as to facilitate an insertion of the stem portion in the intramedullary canal.

7. The apparatus according to claim 3, further comprising a flared adapter slidably mounted on the stem portion, the flared adapter being flared toward the following end of the stem portion to engage with a surface of the intramedullary canal at the opening of the intramedullary canal, to center the stem portion in the intramedullary canal.

8. The apparatus according to claim 3, wherein the stem portion is graduated on an outer surface thereof to indicate a depth of insertion of the stem portion in the intramedullary canal.